ICRI 12

Research Infrastructures at the Forefront – Specific Needs, Lessons Learnt and the Way Forward

Energy

Rapporteur: Anthon Botha

Co-Rapporteur: Lars Grinsted

Chair: Henrik Bindslev

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Philosophical truths for RIs

- It is not the setting of goals that matter, it is the scoring of goals
- Researchers claim to need RIs because problems exist, but industry can often not see what business researchers are in – it appears they just want to set up grander facilities to do what was always done and perpetuate their work
- On collaborating with industry where IPR becomes possible - to scientists: “If you problemise it, then you are the problem.”

Energy as a Grand Challenge

- Is energy research different from research in other grand challenges?
  - It is likely to survive prioritisation
  - It is justified both by its own specialisation and its cross-cutting impact
  - It most often happens close to the market
  - It is diversified from the more conventional to very innovative emerging systems that all co-exist
- Social impact of energy often neglected by R&D
  - Societal and business acceptance is key
  - Linking of innovation and economic models is required

Two paradigms towards Global Energy RIs

- Long term (incremental *vs* disruptive)
  - Energy roadmaps
  - Followed by RI roadmaps
  - Freedom of choice in R&D
  - Planned energy mix
  - Predicted social impacts of energy
- Short term
  - Energy problems - quickly face current challenges
  - Addressed by existing RIs
  - Demand driven R&D
  - Given energy mix
  - Managed social impacts

Main questions addressed related to Energy RIs?

- What needs to be understood in setting up Energy RIs?
- How should Global Energy RIs be created?
- What should Global Energy RIs offer?
- Why strong communities?
- How to get industry involved in Energy RIs?
- What advice to give to the political system?

What needs to be understood in setting up Energy RIs?

- The problems are multifaceted, hence no single RI can address it all
- RI must be unique and have high scientific impact
- Rediscover a systems approach (system of systems)
- Different disciplines are needed to solve any one problem
- There is a need to build community
- Industry involvement is crucial - new energy RIs should preferably be placed where industry meets basic research - bridge the gap between scientific and business language
- Variations in RIs are required along the R&D value chain
  - Multi-disciplinary basic research
  - Research demonstrator
  - Industrial prototype
- Energy RIs should be green and sustainable to inspire scientific social responsibility

How should Global Energy RIs be created?

- Justification for a global RI:
  - Sharing cost and risk on a multinational level
  - Address common challenges
  - Context of geographical and socio-economic dimension
- Close integration (co-development) of RI and energy R&D policies
- Localisation *vs* globalisation:
  - Funders have preference for RIs to be established locally
  - Restricted funding leads to limitation of single generations of RIs per region - who takes responsibility for following generations?
  - Lack of global RI roadmap often results in major gaps of RIs being created
- Strong leadership is essential for implementation

What should Global Energy RIs offer?

- Not always new, but shared
- Also new planned ones
- Unique and versatile
- Global access
- Global support
- e-infrastructure and E-infrastructure

Why strong communities?

- We need community building
  - We have several communities in energy, but not an energy community
  - Fragmented communities often have difficulty in expressing a common problem
  - Intercommunity conversation is required: break fears that disciplines may get polluted and of sharing “own” money

How to get industry involved in Energy RIs?

- Balance the involvement of industry that want to protect their position in the market, with R&D in the public and academic sector that has a culture of spreading knowledge
- Share innovation risk with governments
- To deal with IPR, understand the line between pre-competitive and competitive research – notion of “coopetition”
- Do not think of technology transfer between RIs and industry but rather co-development

What advice to give to the political system?

- Make scientific social responsibility visible and operational through RIs
- Create the planning and thinking fora for RIs
- Facilitate the creation of a global roadmap, gap analysis and identification of RI needs
- Allow the free market to set direction on what RIs are required
- Be generous to allow the movement of people to where these facilities are and promote open access

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Key realisations

- We need to move minds
- We need to build community
- We need engaged representation
- There is no single solution
- Implementation is key
- Emphasise the training of highly qualified people
- Do not be afraid to be relatively close to the market
- Global RIs work best in partnership with global companies
- Uphold the importance of societal issues
- Uphold excellence in science
- Align research, education and social responsibility with market forces